

DOCKET NO: 240441US0

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :
HAJIME IKUNO, ET AL. : EXAMINER: MORILLO, J.
SERIAL NO: 10/620,388 : GROUP ART UNIT: 1793
FILED: JULY 17, 2003 : RCE FILED: JULY 17, 2008
FOR: PISTON MADE OF ALUMINUM :
CAST ALLOY AND METHOD OF
MANUFACTURING THE SAME

FOURTH DECLARATION UNDER 37 C.F.R. § 1.132

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

I, Hajime Ikuno, a citizen of Japan, hereby declare and state that:

1. I have a Master's degree in metallic material engineering, which was conferred upon me by Osaka University located in 2-1 Yamadaoka, Suita, Osaka, Japan.

2. I have been employed by Toyota Central Research & Development Laboratories, Inc., since 1985 and I have over 22 years of work and research experience in the field of metallic materials.

3. The following experiments were carried out by me or under my direct supervision and control.

4. The experimental conditions used to create Tables 9, 10 and 11 of the specification were used to produce the attached Table and sixteen figures.

5. The Table presents compositional data for the Al alloys appearing in the sixteen figures. Fifteen figures show the microstructures of fifteen alloys each containing an amount of Ca within the "Ca (Calcium) : 0.0005-0.003 mass %" of independent Claims 15 and 26. The sixteenth figure (within the box) shows the microstructure of a comparative sixteenth Al alloy (i.e., comparative example sample No. A3, see specification at page 46, Table 9 and Fig. 7) with only 0.0002 mass % Ca and having a coarse, non-homogeneous microstructure.

6. The Table and figures show that the significant improvement in homogeneous microstructure (texture) that is achieved in accordance with the present invention over the range of "Ca(Calcium) : 0.0005-0.003 mass%" is achieved over the ranges of Mg and Ni respectively featured in independent Claims 15 and 26.

7. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

8. Further declarant saith not.

Date: (March 12, 2009) (Hajime Ikuno)

Hajime Ikuno

Attached:

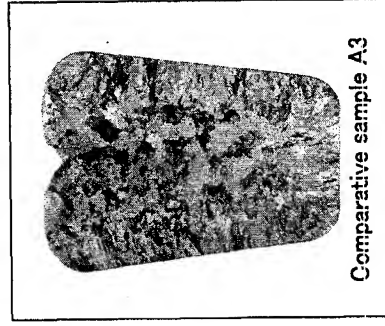
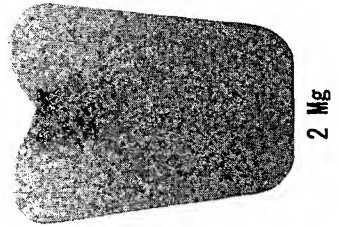
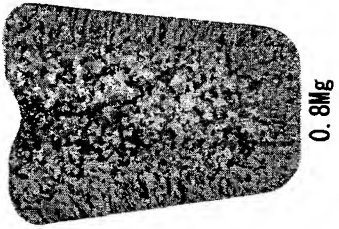
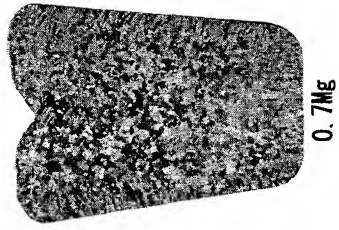
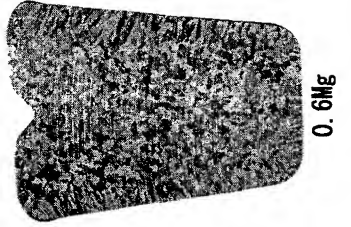
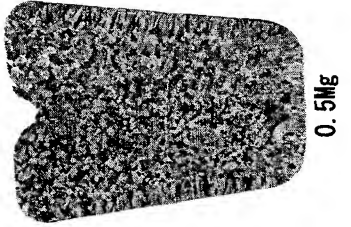
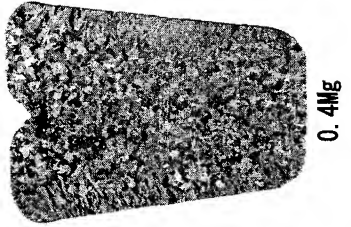
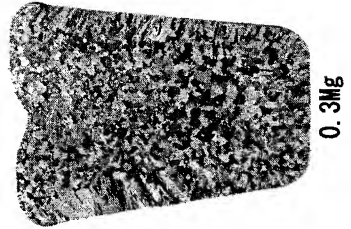
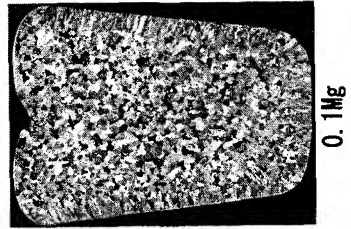
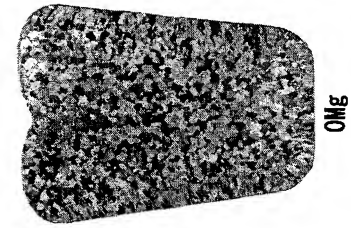
Table

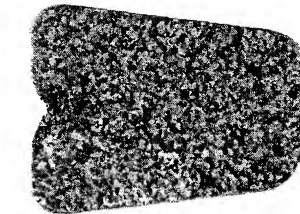
Sixteen figures

2009.3.4 additional data

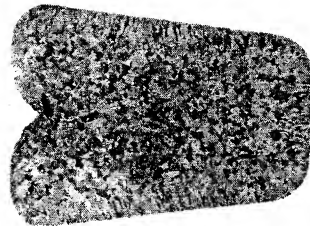
Table

sample Code	chemical composition (mass%)										
	Si	Cu	Mg	Ni	Fe	Mn	Ti	Zr	V	P	Ca
0Mg	13.8	3.0	<0.01	2.3	0.4	0.4	0.20	0.10	0.06	0.01	0.0012
0.1Mg	12.6	3.1	0.1	2.3	0.4	0.4	0.20	0.10	0.09	0.01	0.0013
0.3Mg	12.0	3.0	0.3	2.4	0.5	0.5	0.23	0.12	0.08	0.01	0.0014
0.4Mg	11.9	3.0	0.4	2.4	0.5	0.5	0.23	0.12	0.08	0.01	0.0014
0.5Mg	11.9	3.0	0.5	2.4	0.5	0.5	0.23	0.12	0.08	0.01	0.0015
0.6Mg	11.8	2.9	0.6	2.3	0.5	0.5	0.22	0.12	0.08	0.01	0.0015
0.7Mg	11.8	2.9	0.7	2.3	0.5	0.5	0.22	0.12	0.08	0.01	0.0016
0.8Mg	11.7	2.9	0.8	2.3	0.5	0.5	0.22	0.12	0.08	0.01	0.0017
2Mg	11.8	3.2	2.0	2.3	0.4	0.4	0.25	0.10	0.10	0.1	0.0020
1Ni	11.5	2.9	0.6	1.0	0.5	0.5	0.23	0.10	0.10	0.01	0.0012
1.8Ni	11.9	2.9	0.6	1.8	0.5	0.5	0.22	0.12	0.09	0.01	0.0012
2Ni	11.8	2.9	0.6	2.0	0.5	0.5	0.22	0.11	0.09	0.01	0.0014
2.3Ni	11.7	2.8	0.6	2.3	0.5	0.5	0.22	0.11	0.09	0.01	0.0016
2.5Ni	11.6	2.8	0.6	2.5	0.5	0.5	0.22	0.11	0.09	0.01	0.0019
3Ni	12.2	3.0	0.6	3.0	0.4	0.4	0.20	0.10	0.06	0.01	0.0010
A3	13.8	3.0	<0.01	2.3	0.4	0.4	0.20	0.10	0.06	0.01	0.0002

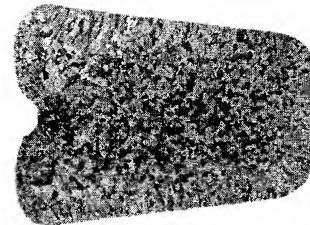




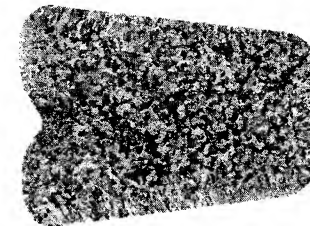
1Ni



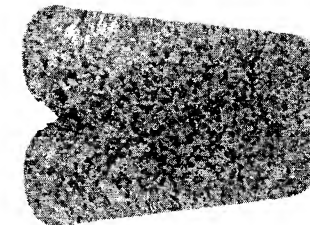
1.8Ni



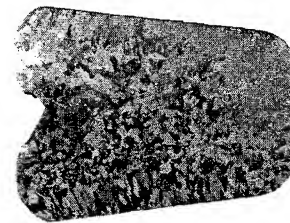
2Ni



2.3Ni



2.5Ni



3Ni